High Cliff State Park

Regional and Property Analysis

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Wisconsin Department of Natural Resources
Bureau of Parks and Recreation

Matt Frank, *Secretary*

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I. Purpose and Introduction

SIGNIFICANCE OF THE RPA IN THE MASTER PLANNING PROCESS

The purpose of the Regional and Property Analysis (RPA) is to provide baseline information on the property and how the property relates to its larger ecological and social context. The RPA serves as an important source of information for later steps in the master planning process (NR 44). The RPA is prepared during the first phase of the planning process as a stand-alone companion to the master plan. The RPA is organized into four components: Introduction, Regional Assessment, Property Assessment, and Findings and Conclusions.

Regional Assessment

- *Provides an overview of the current socio-economic, cultural, ecological, and recreational environment in the region and how they affect the property and its use.*
- *Identifies significant ecological and recreational needs within the property's region.*
- *Defines existing and potential social demands or constraints that should be considered during the planning process that may affect property use.*

Property Assessment

- *Provides an overview of the existing conditions on the property, including natural resources, recreational use and facilities, and adjacent land use.*
- *Describes how the existing conditions relate to management opportunities and needs.*

Findings and Conclusions

- *Uses the information from the regional and property assessments to draw conclusions about the property's niche and serves as the basis for the draft Vision Statement and Property Goals.*

Combined, these sections consider the economic, ecological, and social conditions, opportunities, and constraints associated with the property on a local and regional scale. The state park master planning process spans a wide range of issues and uses and the RPA helps planners to more completely examine the role High Cliff State Park plays in Northeast Wisconsin which will help contribute to sound, long-term planning.

DESCRIPTION OF THE PROPERTY AND REGION

High Cliff State Park is a 1,175-acre property located ten miles east of Appleton on the northeast shore of Lake Winnebago in Calumet County. The park is situated on the Niagara Escarpment, a dolomite (dolostone) ridge that parallels the eastern shore of Lake Winnebago and extends northeasterly to Door County. It is this 223 ft. ledge, with a panoramic view of the lake and surrounding countryside, which gives High Cliff its name.

The natural resources of the site provide the scenic beauty that has attracted people since the early 1900s.

Year-round attendance at the park is near 890,000, making High Cliff Wisconsin's third busiest state park. With its proximity to the Fox Valley, the park is close to a large population base. The park is within twenty minutes of the Fox Cities, forty-five minutes from Green Bay and Manitowoc, and two hours from Milwaukee and Madison (Map A - Regional Locator).

The current master plan for High Cliff State Park was approved in 1982 (WDNR 1982).

Purpose of State Parks

State parks are managed in accordance with Wis. Stat. s. 23.09 to assure the preservation of their scenic value, their historical value, and the natural wonders they contain. Here is the purpose and goals of the State Park System, as outlined in the 2008 Wisconsin State Park System Strategic Plan

Wisconsin State Park Mission:
To protect and enhance the natural and cultural resources of our Wisconsin State Park System properties while providing high quality recreational and educational opportunities and programs.

Wisconsin State Park Goals:

- *Expand the quality and quantity of sustainable, nature-based outdoor recreation opportunities and facilities available to Wisconsin State Park System visitors*
- *Actively manage, restore, enhance, and protect the natural, cultural, and scenic heritage of the Wisconsin State Park System*
- *Provide innovative, interpretive opportunities and programs that foster knowledge, appreciation, and stewardship of the state's natural and cultural resources and promote participation in nature-based outdoor recreation*
- *Strengthen the Wisconsin State Park System facilities development program to better provide for customer comfort and safety*
- *Motivate and enable a dedicated and customer-focused workforce*
- *Achieve financial strength and stability for the Wisconsin State Park System*
- *Attract new Wisconsin State Park System customers through innovative marketing strategies, and retain current customers through exceptional service*
- *Improve operational effectiveness, planning, and decision-making by managing and using accurate and reliable information*

EXISTING ASSESSMENT REPORTS

Many sources were used for this analysis. To assess recreational resources, *The 2005-2010 Wisconsin Statewide Comprehensive Outdoor Recreation Report* (WDNR 2006a) was used, particularly the Upper Lake Michigan Coastal profile. *Rapid Ecological Assessment for High Cliff State Park, Calumet County, WI* (WDNR 2008b) was used for ecological inventories, along with the *Wisconsin Natural Heritage Inventory Working List* (WDNR 2004), *Wisconsin's Wildlife Action Plan* (WDNR 2005b), and many other sources listed in the bibliography. Analyses reflect the best available data at the time the RPA was written.

II. Analysis of the Region

LAND USE AND POPULATION TRENDS

High Cliff State Park (HCSP) is located within Calumet County in Northeast Wisconsin along the shore of Lake Winnebago. The nearest community is the Village of Sherwood, which is adjacent to the park. The closest major urban/metropolitan area is the City of Appleton, located to the west of HCSP (Map A – Regional Locator). During the 2000 Census, the Appleton-Oshkosh-Neenah Combined Statistical Area had a population of 358,365.

Population Growth and Adjacent Land Use Changes

Calumet County had a 30% population increase from 1990 to 2008, giving it an estimated population of 44,727. The majority of this growth took place in the northwest portion of the County near HCSP. This population increase can largely be attributed to the development of agricultural, vacant, and undeveloped parcels of land around the County. Current land uses on properties adjacent to HCSP in both the Village of Sherwood and the Town of Harrison include:

- Single Family Residential
- Commercial District
- Recreation Industry District
- Quarries, Gravel Pits
- Woodland
- Agricultural, Vacant and Undeveloped

Future Land Use Plans for both Municipalities show little to no change in properties adjacent or near HCSP. The Village of Sherwood Future Land Use Plan Map shows a shift in commercial and industrial uses to the far eastern sections of the village. The Town of Harrison Future Land Use Plan Map shows a significant increase in single family, commercial, and industrial uses, and a decrease in agricultural, vacant, and undeveloped land in the northwestern section of the town. None of the plans show a significant change in land use near High Cliff.

Transportation Network

HCSP is easily accessible by using the regional and local highway systems. Interstate 43 is located approximately 25 miles to the east of High Cliff. Additionally, US Highways 10, 41, and 151, as well as numerous State Highways, are located within a ten-mile radius of High Cliff. These networks of highways, along with the local county roads, provide high levels of access to HCSP (Map A – Regional Locator).

REGIONAL RECREATION RESOURCES AND DEMAND AND SUPPLY NEEDS

The following sections describe the recreation demand in the region, supply of opportunities, and trends and issues for future use. Analysis of the HCSP regional recreation demand and supply shortages is drawn primarily from *The 2005-2010 Wisconsin Statewide*

Comprehensive Outdoor Recreation Plan (SCORP) (WDNR 2006a). SCORP classifies and measures the preferences and needs of a statewide recreating public and is an invaluable resource for understanding the supply and demand of regional recreation. SCORP is updated every five years, informing and shaping recreational planning on state properties.

SCORP divides the state into eight planning regions based on a collection of natural resources and tourism assets. The HCSP exists in the Lake Winnebago Waters SCORP Region. Because of the access this region offers to Lake Winnebago, the Fox River, and the Wolf River, water-based recreation is an important element of its recreation supply. Compared to the other regions, the Lake Winnebago Waters Region contains the fewest number of state parks.

Recreation Demand from Local Populations

Recreational demands can be determined, in part, by the level of participation, or the most popular activities in an area. The Lake Winnebago Waters Region has the highest level of participation in the state (compared to other SCORP regions) for activities such as bicycling and horseback riding. The 10 most popular activities in this region are shown in Table 2-1.

Table 2-1: **Regional Recreational Preferences for the Lake Winnebago Waters Region**

Walk for Pleasure	Boating (any type)
Family Gathering	Freshwater Fishing
Driving for Pleasure	Visit a Beach
Picnicking	Snow/Ice Activities (any type)
Bicycling	Swimming in Lakes, Streams, Etc.

Source: 2005-2010 WI SCORP

<u>Regional Supply</u>
The popularity of a specific region is largely based on the supply of the region's recreational activities. One way to analyze a region's recreational supply is to use a recreation location quotient (RLQ). The RLQ is a method used to study the relative abundance or scarcity of a recreation resource in a region compared to the same resource supply at the state level (Equation 1). This allows regions to be compared to each other and compared to the overall state supply. The RLQ is not solely based on the size or number of recreational activities in a region, but rather the size and number per capita of a given resource.

Overall, the Lake Winnebago Waters Region has lower supply levels of view and learning (with 35 unique supply elements) and snow and ice based (with 24 unique supply elements) as defined in the SCORP (WDNR 2006a).

Equation 1. RLQ = % resource in a given locale / % resource in a reference region

Regional Recreational Trends, Issues, and Needs

Understanding the supply and demand of recreational resources is an important component of planning for recreational opportunities. If there is a demonstrated shortage of a particular resource, it is important to know what the future demand for that resource will be. According to SCORP, recreation supply shortages exist in the Lake Winnebago Waters Region for:

- campgrounds
- carry-in boat launches
- trails (cross-country ski, bicycle, and snowmobile)

Another way to understand this demand is by gauging user perceptions of a particular recreation amenity. SCORP also assessed visitor perceptions on their top recreation needs. For the Lake Winnebago Waters Region, these needs are as follows:

- better maps/signage for trails
- more geocaching sites
- more camping opportunities
- more trails
- more kayaking opportunities
- more hunting opportunities

Public Recreation and Conservation Lands within 25 Miles of High Cliff State Park

Map A illustrates the locations of various types of public lands within the region, such as Department managed lands, county public lands, and federal lands relative to the project area. Public lands and recreation supplies are key components for assessing current and future recreation and ecological needs for HCSP. Another public recreation resource is Lake Winnebago. It is approximately 30 miles long and 10 miles wide and has a surface area of 137,708 acres. Lake Winnebago has 88 miles of shoreline and is the largest lake completely within Wisconsin. As detailed in Table 2-2, over 24,700 acres of public land exists within 25 miles of HCSP.

Table 2-2: Public Conservation and Recreation Lands within 25 Miles of High Cliff State Park

Ownership Type	**~ Acres**
Federal Parks and Forests	-
State Forests	-
State Parks*	1,175
State Wildlife Areas	21,579
State Natural Areas**	366
County Parks and Forests	1,651
Total	24,771
	~ Miles
Trails	42

*High Cliff State Park

**Includes 331 acres within other state properties

There are a number of public recreation and conservation properties that complement HCSP by offering other opportunities for nature-based recreation. These include:

State Lands

Brillion Wildlife Area - Located eight miles east of HCSP, Brillion encompasses over 5,000 acres of habitat devoted to a broad spectrum of uses which meet the intent of the current Master Plan. There are 11 wetland restoration areas, 17 parking lots, 1,500 acres of restored grassland prairie, and a 50-acre flowage funded by local partners for waterfowl production. Recreational opportunities include hunting, trapping, canoeing, hiking, wildlife watching, cross county skiing, snowmobiling, and outdoor education.

Killsnake Wildlife Area - Located 15 miles southeast of HCSP, Killsnake measures approximately 7,000 acres with a desired goal of 9,106 acres. The landscape consists of prairie grasslands, uplands with a large wetland-grassland complex, bottomland hardwood forest, a small area of cedar swamp, a small area of tamarack and bog, agricultural landscape, small areas of upland forest and over 50 small wetland restorations. Several rivers also run through the property (South Branch—Manitowoc River, Cedar Creek and Killsnake River). Recreational opportunities include hunting, trapping, canoeing, hiking, wildlife watching, and snowmobiling.

Collins Marsh Wildlife Area - Collins Marsh, 15 miles east of HCSP, is a 4,200 acre property located in Manitowoc County. It is located 12 miles west of Manitowoc and two miles south of Reedsville. The property is comprised mostly of marsh, wetlands, grasslands and bottomland hardwood forest. Recreational opportunities include hunting, trapping, canoeing, hiking, wildlife watching, bird watching, and fishing.

Holland Wildlife Area – This 536-acre property is located 18 miles northeast of HCSP. It consists of bottomland hardwood forest, a small area of cedar forest, and open grassland. Recreational opportunities include hunting, trapping, wildlife watching, and bird watching.

High Cliff Escarpment State Natural Area - This is a 125-acre designation located within HCSP. This natural area features both shaded and exposed cliff habitats along the Niagara Escarpment, talus slopes supporting wet-mesic forest, more than a mile of Lake Winnebago shoreline, and outstanding examples of conical and effigy mounds in the level woodland above the escarpment. This was designated a State Natural Area in 1982.

Stockbridge Ledge Woods State Natural Area - Stockbridge Ledge Woods is a 35-acre property located eight miles south of HCSP. This natural area features a mature forest situated on the top of the Niagara Escarpment. The forest is dominated by large sugar maple, American beech, basswood, and white oak and contains numerous savanna grasses and forbs. Stockbridge Ledge Woods is owned by the DNR and was designated a State Natural Area in 2002.

Fox River State Trail - This 13.5-mile, multiple-use state recreation trail runs between Green Bay and Greenleaf. The portion of the trail south of Heritage Road is 7.7 miles long and permits horseback riding on bridle paths along side the trail corridor.

Brillion Nature Center Trails - Six miles of trails give hikers the chance to view wildlife in marsh, pond, forest, and prairie habitats.

Friendship Recreation Trail - The Friendship Recreation Trail opened in late 2003 and connects Brillion and Forest Junction along Hwy 10. This trail was developed in partnership with the WDNR, Calumet County and the Friends of the Friendship Trail. The trail can be

accessed from Forest Junction or from Hwy 10 in Brillion. The six-mile trail passes through woods, scenic farmland and through the City of Brillion to Horn Park. The trail will eventually connect with the Fox River Trail in Forest Junction. The trail is currently used for hiking, biking, and horseback riding.

County Lands

Calumet County Park - This park is located five miles south of HCSP. Calumet County Park provides access to Lake Winnebago and the Niagara Escarpment. This 200-acre park has a campground, marina and boat launch, and concession building. There are five miles of hiking/mountain biking trails, along with a large playground area, a snow tubing/sledding hill, historic Indian effigy mounds, and a pre-Civil War brick yard.

Becker Lake County Park, Calumet County - This park is located 10 miles east of HCSP. It is still in the early stages of development. A new access road and parking lot were constructed in 2003. Recent plantings of prairie with restored wetlands throughout the park have added attractions for increased wildlife habitat.

Ledge View Nature Center, Calumet County - This nature center is located 10 miles southeast of HCSP. The Ledge View Nature Center sits atop an outcropping of the Niagara dolostone, with a view of the rural countryside. The center offers hiking trails through a field and forest, a 60-foot observation tower, and natural caves. The nature center is open daily year-round, and staffed by three county naturalists. Hiking trails are groomed for cross-country skiing in winter, and snowshoes can be rented for in-park use.

Stockbridge Harbor, Calumet County - This park is located 10 miles south of HCSP located within the Village of Stockbridge, this facility has six launch lanes and a large area for vehicle/trailer parking. This modern boat launch facility is a popular place for fisherman, recreational boaters and personal watercraft enthusiasts to launch and enjoy the lake.

Calumet County Park Trails, Calumet County - These five miles of trails lead users through the county-owned park and on the Niagara Escarpment.

Ledge View Nature Center Trails, Calumet County - These hiking trails lead through forest and prairie habitats. Trails are groomed in winter for cross-country skiing or snowshoeing. Snow shoes can be rented for in-park use.

Solomon Trail, Calumet County - This is a 4.2-mile trail that connects the cities of New Holstein and Kiel. This multi-use, paved trail connects to the Sheboygan River Walkway in Kiel. Benches and rest stations can be found along the way. Solomon Trail is located along State Hwy 57.

Plamann Park, Outagamie County - This park is approximately 257 acres and offers recreational opportunities like swimming, picnicking, and hiking.

County Forest, Outagamie County - This forest has recreational opportunities including bird watching and hiking.

CE Trail, Outagamie County - A 5.3-mile multiple-use county trail that runs between Appleton and Kaukauna in Outagamie County. Permitted uses do not include unleashed dogs or motorized vehicles.

Horseback Trail/Facility and Public Harbor Supply

Two recreational activities closely associated with HCSP and Calumet County are horseback riding and boating on Lake Winnebago. Table 2-3 shows public and private horseback trail/facility locations and public harbor locations within a 25-mile radius of HCSP.

Table 2-3: Horseback Trails/Facilities and Public Harbors within 25 Miles of High Cliff State Park

	Location	~ Distance from HCSP (miles)
Public Horse Trails		
Friendship State Trail	Forest Junction to Brillion	7
Fox River State Trail	Hilbert (area) to Green Bay	8
Private Horse Trails/Facilities		
Autumn Valley Farm	Chilton	15
Stone Face Stables Horse Training	Brothertown	15
Beau Tie Ranch	Reedsville	20
Triple H Hedge Hog Hitching Posts	Cato	22
Public Harbors		
Calumet County Park	Hilbert	7
Stockbridge Harbor	Stockbridge	9

Recreation Prioritization of Land Legacy Areas

The Niagara Escarpment area of Wisconsin received the third-highest ranking for near-term preservation and protection of Wisconsin Statewide Land Legacy recreation areas. This ranking considers potential visitors, population/development pressure, land acquisition costs, conservation significance and recreation potential.

REGIONAL ECOLOGICAL SETTING

Ecological Characteristics

The National Hierarchical Framework of Ecological Units (NHFEU) is a land classification system used nationwide to describe landscapes based on climate, soils, and dominant vegetation types. Using the NHFEU classification system as a basis, the Wisconsin Department of Natural Resources (WDNR) has mapped Wisconsin into 16 distinct Ecological Landscapes. According to the WDNR's system, HCSP and its surroundings are located within the Southeast Glacial Plains Landscape, but also have ecological characteristics of the neighboring Central Lake Michigan Coastal Landscape to the east. Both these landscapes are dominated by glaciated features that offer rich soils for agricultural production. See *Ecological Landscapes of Wisconsin Handbook* (WDNR 2005a) for more information about these landscapes.

The Niagara Escarpment brings significant ecological significance to the region. This escarpment runs from the northeastern United States, just south of Rochester, New York, west across portions of Ontario, Canada, and then southward through Lake Michigan and into Northeastern Wisconsin. The Niagara Escarpment is most well-known where it intersects the Niagara River and creates the Niagara Falls, for which it is named. Due to the unique environment created by the escarpment, HCSP is a biologically diverse area that is home to many rare plants and animals (Anderson, Epstein, Smith & Merryfield 2002).

Wildlife Species of Greatest Conservation Need in the Southeast Glacial Plains

Many native wildlife species in the state, for various reasons, have low or declining populations. These are known as Species of Greatest Conservation Need and have been identified in *Wisconsin's Wildlife Action Plan* (WDNR 2005b). These species are most at risk of no longer being a viable part of Wisconsin's ecology and are in need of management and protection. While some of these species are currently officially listed as endangered or threatened species by the State of Wisconsin, many of them are not.

Wisconsin's Wildlife Action Plan lists those wildlife species of greatest conservation need that may benefit from management within the Southeast Glacial Plains Landscape. Many of the wildlife species of greatest conservation need, particularly rare birds, are associated with the natural communities and habitat types at the High Cliff property. This is discussed in more detail in the property assessment section of this report.

Regional Geological Resources

The primary geological feature is the Niagara Escarpment. It is composed primarily of dolomite of the Silurian age, and is similar to the Onondaga geological formation, which runs parallel to it and just to the south, through the western portion of New York and southern Ontario.

The Niagara Escarpment is the most prominent of several escarpments formed in the bedrock of the Great Lakes. The escarpment is evident in Wisconsin all the way from Kenosha County in southeast Wisconsin, to the tip of Door County at Rock Island State Park. For these reasons, the geology of this feature is of international significance.

Regional Water Resources

Lake Winnebago is the primary water resource in the region. The lake is characterized by having many shallow reefs along the west shore with a drop-off type shoreline on the east side. There are several islands along the west shore.

Lake Winnebago has two primary tributaries, the Wolf River from the west and the Fox River from the south. It has one drainage source, the Fox River, which flows north towards the Green Bay and serves as part of the Fox-Wisconsin Waterway. Cities on its shores include Oshkosh, Fond du Lac, Neenah, and Menasha. Cities that draw their drinking water directly from Lake Winnebago include Oshkosh, Neenah, Menasha and Appleton.

Lake Winnebago is experiencing a variety of impairment issues due to the diversity of adjacent land uses. Currently, Lake Winnebago is impaired by many organic and non-organic pollutants (EPA 2006) including:

- Nutrients
- Phosphorus
- Dissolved Oxygen
- Eutrophication
- Mercury
- PCBs
- Sediment

These issues stem from a variety of sources including stormwater discharges from the Cities of Oshkosh, Neenah, and Menasha, animal waste from surrounding agricultural lands, high levels of phosphorus throughout the watershed, and large amounts of soil loss in Calumet, Fond du Lac, and Winnebago Counties. Many of these water quality pollutants are being addressed by local environmental and comprehensive plans.

Ecological Management Opportunities in the Southeast Glacial Plains Landscape

Management needs and opportunities for any ecological landscape are often described in terms of "natural communities." They are assemblages of native plants and animals that consistently occur together under similar conditions. The Ecosystem Management Planning Handbook describes the best opportunities for sustaining certain natural communities by ecological landscape. "Sustaining natural communities" means ensuring that a given natural community type will be present and has high potential to maintain its characteristic composition, structure, and ecological function over a long period of time (e.g., 100 years). This kind of information can help guide land and water management activities (including active management for recreation, preservation, and restoration of degraded or missing natural communities) to ensure that they are compatible with the capability and potential of the natural communities within a given Ecological Landscape while maintaining important components of ecological diversity and function.

Agricultural and urban land use practices have drastically changed the land cover of the Southeast Glacial Plains since Euro-American settlement. The current vegetation is primarily agricultural cropland. These croplands and other open areas provide surrogate grasslands habitat. Surrogate grasslands now represent the vast majority of grassland habitat in the state, partially replacing the natural prairie habitat that once occurred here. Forests occupy only about 10% of the land area and consist of maple-basswood, lowland hardwoods, and oak. No large mesic forests exist today except on the Kettle Interlobate Moraine which has topography too rugged for agriculture. Some existing forest patches that were formerly savannas have succeeded to hardwood forest due to fire suppression.

Because of this landscape alternation, the higher priority regional ecological management opportunities within and around HCSP are:

- Protection of the Niagara Escarpment, glacial eskers and drumlin fields, that are unique and, in some cases world-renowned, features
- Control of invasive species which are a particular problem in this region due to the high level of development and disturbance
- Opportunities for linking scattered woodlots to provide more closed canopy coverage
- Increasing public land ownership to accommodate recreation needs and ecological functions
- Linking open landscapes for increased habitat opportunities

These opportunities were identified in the *Rapid Ecological Assessment for High Cliff State Park, Calumet County, WI*. Reference this document for a more detailed listing of the opportunities for sustaining specific natural communities.

III. Description and Analysis of the Property and Surrounding Area

This section describes the land ownership surrounding the property, the physical and biological characteristics, recreational facilities and uses, and historical/archaeological resources. Analysis in this section describes significant management issues in the project area, as well as capabilities, limitations, and opportunities of the property.

PARK SETTING

HCSP is located along Lake Winnebago's northeastern shore, between the Village of Sherwood and the Town of Harrison. The state park is surrounded by a mix of land uses. Outside the north and south boundaries of the park are mainly residential developments, and to the east agricultural lands are being converted to residential housing. As the Village of Sherwood continues to grow, more housing developments are expected to be developed next to or near the state park.

The current park ownership is 1,175 acres with a project boundary of 1,196 acres, as shown on Map B - Existing Property Boundary.

Physical Environment

In addition to its proximity to Lake Winnebago, HCSP's geology, topography, and soils provide the foundation for the property's popularity over numerous centuries. The unique physical features of the property are the Niagara Escarpment and Lake Winnebago, Wisconsin's largest self-contained lake.

Geology and Soils

The ridge on which the park is located is actually the exposed edge of the Niagara dolomite layer of bedrock of the Silurian age. It is a prominent feature of the landscape along the eastern shore of Lake Winnebago, with a difference in elevation of about 140 feet. The rocks are resistant to erosion and stand up in relief as a prominent line of bluffs. The escarpment is the same deposit that was quarried from the present park site for building stone, cement, and mortar.

The soils at High Cliff lay in a relatively thin mantle over the dolomite bedrock of the escarpment. The depth of soil over bedrock atop the escarpment varies from just a few inches to a thickness of several feet. Lake Winnebago sits on a deep bed of glacially deposited material. They are mainly glacial deposits made up primarily of silt loams, mucky fine sands, and a fair amount of clay.

Soils in HCSP are primarily classified as loams or silt loams (Map C - USDA Soils Classification). Other soils found at HCSP include:

- Silty Clay Loams
- Sandy Loams
- Organics
- Quarry

Water Resources and Aquatic Habitats

Lakes

The state park is located along the northeastern shoreline of Lake Winnebago. This 2.3-mile long shoreline is mostly undeveloped and provides both water quality and habitat protection to Lake Winnebago. The park offers public access to the lake through a marina and a beach.

It is one of the more heavily fished lakes in the state. Many fishermen consider it one of the nation's top walleye fisheries. The lake also has one of the United States' largest populations of lake sturgeon, which are speared during a February season.

Due to concerns about algae blooms along the northeastern bank of Lake Winnebago, a water clarity study was conducted at three locations along the shore of HCSP during the summer months of 2009. The three locations were the “Lake” located just north of the marina along the shoreline, the “Harbor” located within the marina, and the “Beach” located at the HCSP beach. All three samples were taken using secchi readings. This method of sampling measures the depth of water clarity in a specific location. Samples were taken from May 26, 2009 through August 26, 2009. The readings showed the difference in water clarity between the three sites over the four month period was an average of 1.23 cm. Using the readings, a statistical evaluation called an Analysis of Variance (ANOVA) was conducted and it was determined that there is no significant difference in secchi depths between the three tested sites. It was also stated that wind speed and direction did not appear to have a specific impact on water clarity. Further algae bloom studies, at or near the property, include the possibility of sampling for another year on a strict regimen and possibly using sampling points from other areas of Lake Winnebago.

Streams

Two unnamed streams run through the property. The water clarity of the two streams is relatively good, with bottom materials of clay and hardpan. Combined length of these streams is about 4.5 miles. Although relatively clear running, the streams do carry a certain amount of nutrient runoff from the adjacent 18-hole golf course and subdivision. This runoff contributes to the fertility of Lake Winnebago and the ensuing algae growth.

VEGETATION AND NATURAL COMMUNITIES / HABITATS

Current Vegetation and Forest Resources

The park is dominated by a mixture of open grasslands and forested areas. There is also a dolomite cliff zone that supports a Talus Forest along with dry and moist cliff areas. At the base of the cliff, small seepage areas and spring runs emerge from the talus.

A mature Southern Mesic Forest, dominated by sugar maple, borders the Niagara Escarpment. Associated canopy trees are red and white oak, American beech, white ash, basswood, shagbark hickory, and hackberry.

The park has had major human disturbances since the region was settled in the late 1800s, including agriculture, quarrying, lime kilns, logging, roads and trails, old small scale garbage dumps, usage and alterations of springs and seepages, and the impacts of other human usage of the park (Clark 1999). Fields within the park contain a mix of native and non-native species, including wild bergamot, smooth brome, goldenrod, common timothy, and common milkweed and, along with the woodlands, provide habitat for numerous bird species designated as Species of Greatest Conservation Need (SGCN).

Table 3-1 summarizes the various forest and vegetation cover types occurring in the park as illustrated on Map D - Existing Vegetation Cover Types.

Table 3-1: Forest and Vegetation Cover Type for High Cliff State Park

Cover Type	Acres	% Total
Escarpment / Talus Forest	188	16
Southern Mesic Forest	212	18
Managed Forest / Plantation	94	8
Cottonwood	7	<1
Mixed	106	9
Grassland	529	45
Field and Row Crop	24	2
Open Water	15	<1
Total:	**1,175**	

Invasive Species

Some invasive plants are well-established within HCSP. Garlic mustard is prolific throughout the park in every area not managed as prairie or lawn. Common buckthorn, Tatarian honeysuckle, and white and yellow sweet-clovers are abundant in some areas. Wild parsnip, which can cause phytophotodermatitis, is present in the park. Helleborine orchid, common mullein, creeping charlie, dame's rocket, Japanese knotweed, motherwort, reed canary grass, and common burdock are also present and they pose possible future threats to diversity.

Natural Communities

HCSP supports a diversity of natural communities which differ in size and quality. High quality natural communities listed in the Natural Heritage Inventory (NHI) database found within HCSP are:

- Dry Cliff
- Moist Cliff
- Southern Mesic Forest
- Talus Forest

General descriptions of these natural communities can be found in *Rapid Ecological Assessment for High Cliff State Park, Calumet County, WI* (WDNR 2008b).

WILDLIFE RESOURCES

HCSP supports broad range of wildlife habitats – from large blocks of Talus forest to open grasslands that offer a broad diversity of species. The wildlife resources within the property are very similar to the larger region surrounding the park, but several unique species are found here, too.

Small game species commonly found in Calumet County are also present on the property. These include gray squirrels, raccoons, skunks, opossums, deer, woodchucks, 13-striped ground squirrels, chipmunks, mice, shrews, and bats. Present, but rarely seen, are red fox, gray fox, badgers, weasels, coyotes, and mink.

The deer population in the park is managed as part of Deer Management Unit 64. HCSP is designated as Unit 64A. The current population density goal for Unit 64A is 25 deer living in the park. Deer hunting in Unit 64A is controlled by issuance of a limited number of deer hunting permits. Deer density goals are not determined by the Master Plan, but are set through the statutory review processes and are updated every three to five years. Based on observations by wildlife staff, deer are causing significant damage to ground layer plants or forest regeneration. Since the early 1980's, hepaticas, bellwort, yellow ladyslipper, Virginia bluebells, spring beauties, and various species of trilliums have either become absent or have been reduced to low numbers due to the concentration of deer within the park and surrounding areas.

HCSP is also a premier area to watch the warbler migration in the spring. The park is also home to several purple martin colonies and upland birds such as ruffed grouse, ring-necked pheasant, and wild turkey. The ongoing Wisconsin DNR Strategy for Protecting Bird Migration Stopover Habitats in the Western Great Lakes project has recognized HCSP as a high-quality Migratory Bird Stopover Site that provides habitat for 10,000+ birds during the spring migration (Grveles and Matteson 2008).

The entire property supports a host of resident and seasonally present wildlife species that may be inconspicuous but are still very important to the ecological and social values of the property. These include many birds, such as woodpeckers, nuthatches, and chickadees, and birds of prey such as hawks and owls. Small mammals present, both observed and documented from species records, include voles, shrews, mice, ground squirrels, and bats. Amphibians and reptiles present include leopard frogs, wood frogs, gray tree frogs, toads, snapping turtles, painted turtles, garter snakes, DeKay's snakes, and fox snakes.

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

Department of Natural Resources surveys of the HCSP property have documented several special concern species that are listed in Table 3-2. In addition, sightings of Acadian Flycatcher and Cerulean Warbler were reported within the park during Breeding Bird Surveys, but their presence could not be confirmed. There was also a sighting of a four-toed salamander that needs to be confirmed.

Table 3-2: Documented Rare / Threatened Species upon the Property

Common Name	Scientific Name	State Rank	State Status
Animals			
A Land Snail	Catinella gelida	S1S2	Special Concern
Dentate Supercoil	Paravitrea multidentata	S2S3	Special Concern
Dickcissel	Spiza Americana	S3	Special Concern
Thin-lip Vallonia	Vallonia perspective	S3	Special Concern
Plants			
Great Waterleaf	Hydrophyllum	S2S3	Special Concern
Snow Trillium	Trillium nivale	S3	Threatened

*Definition of State Rank Abbreviations:
S1 = Critically imperiled in Wisconsin because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from the state
S2 = Imperiled in Wisconsin because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state
S3 = Rare or uncommon in Wisconsin (21 to 100 occurrences)

LANDSCAPE OF SPECIAL CONCERN

High Cliff Escarpment State Natural Area

The High Cliff Escarpment was designated a State Natural Area in 1982. It features both shaded and exposed cliff habitats along the Niagara Escarpment, talus slopes supporting wet-mesic forest, more than a mile of Lake Winnebago shoreline, and outstanding examples of conical and effigy mounds in the level woodland above the escarpment. At the escarpment summit are vertical cliffs up to 25 feet high that contain fragile fern, bulblet fern, leaf cup, cliff stickseed, pale jewelweed, harebells and long-beaked sedge. The talus slope below the cliff is composed chiefly of small, flat rocks, although some areas of large limestone boulders occur, and many seepages emanate from the rocks. The Talus Forest is a unique site that supports rare plant and animal species found along the Escarpment cliff face and scattered rocks. The undisturbed forest on the slope is composed of sugar maple, basswood, white ash, green ash, elm, hackberry, and butternut. Closer to the lake, willows and cottonwood gradually appear. A rich herbaceous layer includes wild ginger, great water-leaf, false rue anemone, squirrel-corn, toothwort, and Canada violet. Across Wisconsin, this type of landscape is critically imperiled because of its extreme rarity and its vulnerability to extirpation from the state.

EXISTING RECREATIONAL FACILITIES AND USES

The park provides a variety of recreational opportunities, including hiking, boating, biking, camping, swimming, picnicking, nature study, and photography (Map E – Existing Administrative and Recreation Facilities). The primary draws are the water recreation and camping.

During the 2009 fiscal year, HCSP had nearly 890,000 visitors, making this the third busiest park in the system. Approximately 90% of these visitors were from Wisconsin.

Much of HCSP's popularity can be attributed to its recreational facilities and its proximity to populated areas such as Appleton, Oshkosh, Fond du Lac, and Green Bay, which are all within 30 miles of the park.

Camping

There are three main types of camping opportunities available at the park, including traditional/family camping, group camping, and cabin camping (Table 3-3). Both reservable and non-reservable (first-come, first-served) sites are available. There are flush toilets on site. There is a specially designed cabin for campers with disabilities that is available from May through mid-October. The park has a 98% weekend camping occupancy rate and 86% of all campers reside within Wisconsin. Based on the occupancy rate, this park could accommodate more camping sites.

Table 3-3: High Cliff State Park Camping Facilities

Camping Type	Sites
Modern Family – non electric	80
Modern Family – electric	32
Group Campground	8
Disabled Accessible Cabin	1

Recreational Trails

There are over 32.5 miles of trails in HCSP as shown in Table 3-4. Within the park is the Lime-Kiln Trail, a 2.3-mile path starting at the ruins of tall stone ovens that were used between 1895 and 1956. The Indian Mound Trail is a short and easy path exploring the ancient Indian mounds. The Forest Management Trail is a 1.3 self-guided interpretive walk through the forest. The 8.5-mile High Cliff Horse Trail is a seasonal trail open May to November. Approximately 3 miles of marked trail are open to snowmobiles and 4 miles of groomed track are made available to cross-country skiers. The snowmobile trail connects Calumet County snowmobile trails to Lake Winnebago. The existing park roads are also very popular with visiting bicyclists and bicyclists from the local community.

Table 3-4: High Cliff State Park Trails

Trail Type	Miles
Hiking	5
Nature	2
Road Biking	2.5
Mountain Biking	10
Horse	8.5
Cross-Country Skiing	4
Snowmobile	3

Through public meetings, support has been expressed for improving the trail network in and around HCSP. Ideas have included trail connections to Calumet County Park, a bike route linkage between HCSP and neighboring cities, redevelopment of the Lime Kiln trail, and development of an Escarpment hiking/biking trail.

Day Use Areas

The park's day use area consists of a museum, a general store, picnic grounds, a marina, a nature center, beach areas, and several scenic trails. The museum features historical displays from the early 1900s, including farm implements and vintage clothing. Visitors find a host of park-printed material highlighting the area's native wildlife, flowers, the Indian mounds, and more. Historic artifacts and a few antiques enhance the atmosphere of this quaint structure. Ranger-led interpretive programs and guided hikes teach visitors about their historic surroundings. The museum is open only during summer weekends from 1 PM to 5 PM.

A 40-foot observation tower is located near the park pavilion and offers panoramic views of Lake Winnebago, the lakeside cities, and the expansive countryside. Near the base of the observation tower is a large picnic pavilion with fireplace. A children's playground is also nearby. The 3.7-mile Red Bird Hiking Trail is also accessible from the tower. The trail features the 12-foot bronze statue of Red Bird, the Winnebago Indian chief. Other day use facilities are listed in the Table 3-5.

Table 3-5: High Cliff State Park Day Use Facilities

Facility	Number
Picnic Areas	4
Baseball Diamond	1
Horseshoe Pits	2
Volleyball Courts	2
Playgrounds	2
Open Air Shelters	3
Enclosed Shelter	1
Observation Tower	1
Beach / Bathhouse	1

Enclosed Shelter (Pavilion)

Located in the upper park, the Pavilion is an enclosed shelter that accommodates up to 100 people. This shelter is next to the open air upper shelter, overlooks Lake Winnebago and is within walking distance of the observation tower. The Pavilion features a centrally located fireplace and vaulted wood ceilings. It is often reserved for reunions, weddings, and company outings. The Pavilion is reservable May through September and also available for off-season rentals.

Water Recreation

Boating

The park has a marina that offers 4 boat launch ramps, 85 seasonal slips, 12 transient slips, a mooring field and a concession stand. The marina is currently operated by a private concessionaire that has an agreement with the State of Wisconsin. In 1998, break wall modifications took place to further prevent waves from disturbing the boats in the harbor/ launch area. Within the last few years an evaluation of the design and operations of the marina has begun. There are a number of elements under design modifications that include:

- Relocation of the boat ramps to reduce on water congestion
- Circulation rates and flow direction of the marina waters for improved water quality
- Fishing access from the break walls
- Non-motorized water access opportunities

Beach

The 250-foot designated beach area located on Lake Winnebago is a popular destination for park visitors. The beach offers a playground, picnic tables, a roped swimming area, and a grassy sunbathing spot. There is a building that offers flush toilets, changing area, and hot water showers for rinsing after swimming. With the advent of the break wall reconstruction, the beach sand area has moved up the shoreline towards the marina break wall by wave action. Since this has happened, the existing beach zone is not used as it once was. Design modifications will be considered in the master plan to improve beach access and facilities. Park staff observations suggest that beach use has declined over the decades due to changing swimming preferences and a perceived decline in water quality.

Fishing

Fishing opportunities are abundant both in summer and winter along the shores of the park. Current fishing opportunities exist from atop the marina break wall and along the shoreline. Ice fishing is also a popular activity initiated from the park.

Pond Complex

In the 1960s, a dam was built that impounded the two natural streams that flowed into the marina and Lake Winnebago. Because of the shape of the pond, this dammed area is referred to as the Butterfly Pond complex. The dam structure was reconstructed in 1977 with remedial work done in 1992. The dam had a history of leakage since its reconstruction in 1977. In 2009, an investigation of the current dam revealed seepage around and

underneath this earthen structure. Because of safety concerns for dam failure, the Department of Natural Resources breached the dam and emptied the water from the Butterfly Pond complex. When full, this 3.6-acre pond complex offers pan fishing opportunities from the shoreline. Through the master plan process, the DNR will investigate alternatives for this area to determine the costs and benefits for reconstruction alternatives to enhance recreation opportunities and environmental conservation.

Hunting

Since 2007, deer hunting with muzzleloaders has been allowed in the park during the traditional nine-day November hunt. This hunt is by permit to control deer herd size and limit its impacts on vegetation. An estimated 80 deer populate the immediate vicinity of the park. The current over-winter goal at the park is to maintain a healthy deer herd of 25 deer so as to stay within the capacity of the landscape. This allows plant communities to regenerate and survive while still enjoying the deer resource. HCSP is closed to all other hunting.

Other Property Considerations

Friends of High Cliff

Friends of High Cliff State Park is a non-profit organization dedicated to promoting a greater appreciation of HCSP. The friends group was organized for the charitable and educational purpose of supporting, assisting, and promoting the Wisconsin Department of Natural Resources with interpretive, scientific, historical, educational, and related visitor services at HCSP in Calumet County. Although the group does not employ the park naturalist directly, it does support the position by providing funds through the Natural Resource Foundation. Thousands of school children, adults, and families benefit every year through the programs the naturalist offers.

Prior to the existence of the Friends of High Cliff, the High Cliff Forest Park Association was the group that proposed and supported the establishment of HCSP. They were also instrumental in funding development of High Cliff through fundraising and donation of many thousands of dollars as well as in-kind gifts.

SOCIAL / CULTURAL RESOURCES

Interpretive Considerations

An interpretive plan was developed in 2008 for HCSP. This plan highlights the important interpretive values and themes. The following areas are highlighted within the plan:

Biological areas

- Butterfly Pond and Accessible Trail
- Ephemeral Ponds
- Lake Winnebago
- Lucky 13 Demonstration Forest and Reforestation Area
- Prairie/Native Plantings Sites
- Purple Martin Colonies
- Quarry Pond

Cultural resources

- Chief Red Bird Statue
- High Cliff Effigy and other Burial Mounds
- High Cliff General Store (Museum)
- Lime Kiln Ruins
- Stone Fence

Geological resources

- Niagara Escarpment
- High Cliff Quarry

There may be additional opportunities for interpretive services. For example, interpretive offerings on the Indian Mound Trail are modest and could be improved.

Historical / Archaeological Resources

Three separate mound groups are contained within the park, and all have been impacted to some degree (Map F – Historical Archeological Features). The best preserved mounds lie along the escarpment edge and are accessible by an interpretive trail located due north of the Family Camp area. Presently, this group includes a number of panther and conical or ovoid forms; other mounds once present in this group included several bird, quadruped, linear, and additional panther mound forms. First mapped by Increase Lapham in the mid-1800s, this mound site is listed on the National Register of Historic Places. Preservation and management of the park's mound areas are done in a manner consistent with Wisconsin's *Burials, Earthworks, and Mounds Preservation Policy & Plan* (WDNR 2008a) and with state law (*Wis. State Statute 157.70*), which affords them protection from unnecessary disturbances.

Another cultural feature is a 12' bronze statue which commemorates the famous Ho-Chunk (formerly Winnebago) Chief Red Bird. Popular history has it that Chief Red Bird frequented the High Cliff area and often brought the children of tribal members to the cliff for story-telling sessions.

Remnants and ruins from the former Western Lime and Cement Company quarry, lime kiln operation, and company town occupation remain as reminders of the more recent past. Historic ruins are managed as relic features that can be viewed by the public. An on-site historic display tells about the ruins. The park's interpretive center, housed in the former High Cliff General Store, also displays historic photographs of the quarry and life in the "old days."

NON-PUBLIC USE FACILITIES OR STRUCTURES

The only area of the park which is not intended for general access by the public is the shop and storage area, totaling about two acres. Storage, parking and general maintenance and support of the park infrastructure are carried out or centered at this facility.

SPECIAL DESIGNATIONS / SETTINGS WITHIN THE PROPERTY

There are three special designations within the property that have unique objectives or other administrative / legal restrictions beyond the current master plan (Map G). These are:

High Cliff Escarpment State Natural Area - The 125-acre High Cliff Escarpment State Natural Area features both shaded and exposed cliff habitats along the Niagara Escarpment that extend to the shores of Lake Winnebago. At the escarpment summit are vertical cliffs up to 25 feet high that contain fragile fern, bulblet fern, leaf cup, cliff stickseed, and long-beaked sedge. The talus slope below the cliff is composed chiefly of small, flat rocks, although some areas of large limestone boulders occur. Many seeps emanate from the rocks. The forest on the slope is composed of sugar maple, basswood, white ash, green ash, elm, hackberry, and butternut. Closer to the lake, willows, and cottonwood gradually appear. A rich herbaceous layer includes wild ginger, great water-leaf, false rue anemone, squirrel-corn, toothwort, and Canada violet.

Conservation Easement Areas - Conservation easements were acquired on several areas of the adjacent High Cliff Golf Course. Three easements, totaling 76 acres prevent the development of any non-park structures on the premises.

Forest Management Demonstration Area - HCSP has one forest management demonstration area, known as the “Lucky 13 Demonstration Forest.” Tree plantings and selective cutting takes place to give this area a more natural appearance. The 1.3-mile Forest Management Trail leads along 26 posts, each with its own demonstration point. A companion guide is distributed at the park office. Within the management area, a deer exclosure has been built to help demonstrate the impacts of deer presence.

IV. Findings and Conclusions

This section presents the conclusions from the HCSP Regional and Property Analysis and collects findings from other relevant publications. The following two sections summarize existing conditions and trends on the park and in the region. Specific trends addressed include the ecological significance and capability of the property, as well as the property's recreational needs, opportunities, limitations, and significance. This section does not include every finding and conclusion; rather, it provides a summary of the major findings.

The findings and conclusions presented here will help guide HCSP's future management, use, and development by highlighting significant opportunities and limitations on the property. It will also define the reasonable range of management alternatives to be considered in the master planning process. As planning for the property continues, conclusions will ultimately help define the property's future recreation amenities and uses, forest resources, and natural landscape.

HCSP is a scenic, intensively-used, year-round outdoor recreational property that supports important ecological resources. This analysis shows there are opportunities to expand and enhance recreational facilities to better meet the current and projected recreational needs, while continuing to protect and enhance critical habitats for rare species. These opportunities and limitations for HCSP are summarized below:

ECOLOGICAL SIGNIFICANCE, CAPABILITY, AND OPPORTUNITIES OF HIGH CLIFF STATE PARK

HCSP's primary ecological significance is drawn from its placement along the shore of Lake Winnebago and its overlap with the Niagara Escarpment. The presence of the Niagara Escarpment is significant at both the regional and property levels. Several important native communities exist at the park due to the Niagara Escarpment, which creates unique habitats for many rare and endemic plants and animals.

Regional Ecosystem / Wildlife Management Opportunities

The *Wisconsin Land Legacy Report* lists the Niagara Escarpment as having the highest conservation significance on their five-point scale, meaning that "the area possesses outstanding ecological qualities, is of adequate size to meet the needs of critical components, and/or harbors natural communities or species of global or continental significance" (WDNR 2006b). *Wisconsin's Wildlife Action Plan* (WDNR 2005b) cites the higher priority regional ecological management opportunities as:

- Protection of the Niagara Escarpment, glacial eskers and drumlin fields, that are unique and, in some cases world-renowned, features. The Niagara Escarpment is the dominant terrestrial feature of the immediate area of High Cliff and gives the park its name. This includes the High Cliff Escarpment Natural Area located within High Cliff.

- Throughout the region, there are opportunities for linking scattered woodlots, linking open landscapes (surrogate grasslands), and controlling invasive species.

- Riparian zones throughout the region present an opportunity for restoration. The Lake Winnebago shoreline presents opportunities for increased natural shoreline management.

Property-level Ecological Needs and Opportunities

Ecological management opportunities occur within a property when the need to protect specific native plants and animals coincide. *Rapid Ecological Assessment for High Cliff State Park, Calumet County, WI* identifies these specific needs for the property (WDNR 2008b). The following are significant ecological features or characteristics identified in the assessment:

Migratory Bird Stopover Site

The state park was determined to be a high-quality Migratory Bird Stopover Site that provides habitat for 10,000+ birds during the spring migration by the ongoing Wisconsin DNR's Strategy for Protecting Bird Migration Stopover Habitats in the Western Great Lakes project. An online checklist program for recreational and professional bird watchers, eBird.org (2010) has noted 118 bird species documented during the months of April, May, September, and October between 2003 and 2009. Many factors contribute to HCSP's ability to provide all of the resources needed (e.g. shelter, protection from predation, food, and water) for many individuals of many bird species to accumulate mass during migration. Lake Winnebago, situated along the Niagara Escarpment, provides a north-south corridor that funnels birds northward in the spring. The location of the state park in a landscape dominated by agriculture and urban settings makes the remaining natural habitats within the park, especially those with high structural diversity near water, very important foraging and perching opportunities. Threats to Migratory Bird Stopover Sites and migratory birds include habitat destruction and habitat alteration. Habitat alteration includes the simplification of forest structure or the alteration of forest composition, including invasive species that may change the kinds, quantity, and quality of food resources.

Rare Snails

Rare terrestrial snails, some of which may occur in few or no other locations in the world and date back to the last Ice Age, are found along the Niagara Escarpment. These snails were widespread in the Pleistocene and are restricted now (in the Midwest) to cool moist microhabitats found primarily in the Niagara Escarpment and the Driftless Area. Of the 100 or so species of land snail in Wisconsin, almost a third are tracked by NHI and seven are globally rare to globally imperiled (WDNR 2002). About 20% of Wisconsin's land snail fauna are imperiled to critically imperiled in the state and three species are currently protected as State Endangered or Threatened. Most of these rare snail species dwell in cliffs, though a few species use woodlands or wetlands. All of these rare snails are very small, with shell diameters of only a few millimeters.

Talus Forest

Knowledge about the species composition, range, and rarity of Talus Forests in Wisconsin is limited. Within Wisconsin, the distribution of Talus Forests is restricted due to environmental

constraints. The best examples occur in the Baraboo Hills, the Blue Hills, and along the Niagara Escarpment. The Talus Forest at HCSP provides habitat species of conservation need, including the rare snails and migratory birds cited in this document.

Mesic Forest

In addition to providing significant opportunities to preserve habitat for species requiring large blocks of unbroken Talus forest, the park provides opportunities to produce upland birds, waterfowl and other wildlife. Some forest stands provide an opportunity for management of early successional wildlife habitat for species such as deer, grouse, and younger-forest songbirds.

Prairie-Forest Border Eco-Region

HCSP was recognized as a "Functional Site" in The Nature Conservancy's *The Prairie-Forest Border Eco-region: A conservation plan*, because it contains an ecologically sensitive stretch of the Escarpment that supports populations of highly specialized, globally rare land snails (TNC 2001).

Site-specific Ecological Opportunities

The Rapid Ecological Assessment for High Cliff State Park, Calumet County, WI (2008b) also identified the following site-specific ecological opportunities:

Escarpment Forest

This 287-acre site contains a linear, three-mile long section of the Niagara Escarpment above Lake Winnebago. During the master planning process, the State Natural Area (SNA) boundaries should be evaluated to include the rare species and natural communities that occur within this site, but outside the current boundaries of the SNA. Rare species include three rare snails: A Land Snail (Catinella gelida), Dentate Supercoil (Paravitrea multidentata), and Thin-lip Vallonia (Vallonia perspectiva), and two rare plants snow trillium and great waterleaf.

Campground Forest

This 93-acre site borders the Escarpment on the south end of the park and contains the largest block of Southern Mesic Forest on HCSP. The dominant canopy tree is sugar maple with red and white oak, basswood, shagbark hickory and hackberry as associates. Characteristic understory species include American cancer-root, mayapple, leaf-cup, elm-leaved goldenrod, spotted coralroot, garlic mustard, and Pennsylvania sedge. Quality of the forest varies from poor to good, based on the logging history, degree of garlic mustard invasion, and campground development. This site provides important forest cover for migratory birds, as well as a buffer to the ecologically-sensitive Escarpment.

Northern Forest

This 42-acre site contains a mature Southern Mesic Forest bordering the Niagara Escarpment on the north end of HCSP. The dominant canopy tree is sugar maple, with diameters up to 20 feet. The site has been logged in the past, most recently with a selective

cut. There are numerous logging roads and hiking trails. This site provides important forest cover for migratory birds, as well as a buffer to the ecologically sensitive Escarpment.

RECREATIONAL NEEDS, OPPORTUNITIES, SIGNIFICANCE, AND CAPABILITIES OF HIGH CLIFF STATE PARK

HCSP is the third busiest property in the State Park System. The majority of users are Wisconsinites from the Fox Valley region.

Lake Winnebago and the Niagara Escarpment influence recreation demands in the region. With the location of HCSP in close proximity to a larger urban population, this makes it a particularly important place for recreation in this part of the state.

HCSP supports many of the popular activities in the region including family gatherings, walking and driving for pleasure, picnicking, snow/ice activities, boating, bicycling, beach activities and swimming. In terms of supply of recreational activities, the six-county region mentioned above does have a slight abundance of water-based activities; however, the supply levels are still low compared to other regions in Wisconsin. Shortages in the region exist for non-electric campsites, parks, and non-motorized trails. The needs identified by users are more biking trails, more electric campsites, and more hiking trails. Comparing the needs to the shortages suggests that the future niche for the HCSP might be for more electric sites and more hike/bike trails.

There are quite a few county parks, state trails, State Natural Areas, and Wildlife/Fishery areas within 25 miles of the park, but there are no state parks or state forests.

Parks were also identified as a recreation shortage as described above. This again signifies the importance of the HCSP as a public recreation area in a region with few state parks or forests.

Water-based Recreation Opportunities

HCSP is the only state park on Lake Winnebago, Wisconsin's largest self-contained lake. The regional demand for water-based activities is high and the supply does not currently meet the demand. HCSP has the opportunity to meet some of the regions water-based recreational needs by:

- Improving the swimming beach
- Improving/relocating the boat launch
- Studying the supply/demand/carrying capacity of finger piers and mooring fields to determine the feasibility of making additions within the shelter of existing break walls

Land-based Recreation Opportunities

HCSP has a variety of land-based recreational opportunities. The parks topography allows for high experiential trails, campground locations, and scenic vistas. HCSP has the opportunity to meet some of the regions land-based recreational needs by:

- Establishing a regional trail connection to Calumet County Park and a bike route from HCSP to the neighboring cities
- Providing soundscape management techniques to enhance natural soundscape conditions
- Considering camping expansion within the property
- Redeveloping the Lime Kiln hiking trail and creating an Escarpment hiking/biking trail
- Establishing new family-style campground
- Enhancing existing outdoor group camp and adding a shower building
- Improving the Indian Mound Trail and identifying additional opportunities for expanding interpretive services
- Consider increasing opportunities for bicycling, horseback riding, geocaching and disc golfing

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